

REMARKS

In the Office Action, the Examiner allowed Claims 8 and 10-12, but rejected Claims 1-7, 9 and 18. In particular, Claims 1, 2, 4 and 18 were rejected under 35 U.S.C. 102 as being fully anticipated by U.S. Patent application publication no. 2004/0124450 (Yeap), and Claims 6 and 7 were rejected under 35 U.S.C. 103 as being unpatentable over Yeap. Also, Claims 1, 5, 6 and 18 were rejected under 35 U.S.C. 102 as being fully anticipated by U.S. Patent 5,168,072 (Moslehi).

Claims 1-4, 6, 7, 9 and 18 were further rejected under 35 U.S.C. 112 as being indefinite. With respect to this rejection, the Examiner noted that, in Claim 1, line 12, "mark" should be "mask". The Examiner also found the phrase "source and drain regions extensions," which is in Claim 9, to be unclear.

Claims 1 and 9 are being amended to address the rejections of Claims 1-4, 6, 7, 9 and 18 under 35 U.S.C. 112.

More specifically, in Claim 1, as the Examiner suggested, "mark" is being changed to "mask." It is believed that this corrects the indefiniteness of Claim 1, and overcomes the rejection of Claim 1 and Claims 2-4, 6, 7 and 18, which are dependent from Claim 1, under 35 U.S.C. 112.

Also, Claim 9 is being amended to change "source and drain regions extensions" to "source and drain extension regions." The language of Claim 9 is now consistent with the language of Claim 8, from which Claim 9 depends; and in particular, it is now clear that the term "regions" in Claim 9 refers to the "source and drain extension regions" of Claim 8. This overcomes the indefiniteness of Claim 9 and the rejection of this Claim under 35 U.S.C. 112.

In view of the foregoing, Claims 1-4, 6, 7, 9 and 18 are clear and definite, and the Examiner is respectfully asked to reconsider and to withdraw the rejection of these claims under 35 U.S.C. 112.

Claim 9 is dependent from Claim 8, which has been allowed, and it is believed that Claim 9 now also is in condition for allowance without further discussion.

Applicants also wish to note that Claim 3 was not rejected over the prior art, and that the above-discusses amendment to Claim 1 overcomes the only rejection of Claim 3.

In addition, independent Claims 1 and 5 are being amended to better define the subject matters of these claims. For the reasons set forth below, Claims 1-7 and 18 patentably distinguish over the prior art and are allowable. The Examiner is thus also asked to enter this Amendment, to reconsider and to withdraw the above-discussed rejections of Claims 1-7 and 18 over the prior art, and to allow these claims.

Generally, Claims 1-7 and 18 patentably distinguish over the prior art because the prior art references do not show or suggest the step of keeping away from the semiconductor substrate, the ions used in the implanting step described in Claims 1 and 5 – that is, the implanting step during which a gate layer is implanted with ions.

In order to best understand this difference between the present invention and the prior art, it may be helpful to review briefly this invention and the prior art.

As discussed in the present application, the instant invention, generally, relates to the use of a disposable spacer, in the manufacture of semiconductor devices, to facilitate post doping of the gate conductor without disturbing the optimum source and drain doping profile. More specifically, in accordance with the preferred embodiment of the present invention, a gate stack, including first and second layers, is formed on a dielectric layer, and a disposable spacer is

formed around those first and second layers of the gate stack. The second layer of the gate stack is then removed, and then ions are implanted into the remaining, first layer. The disposable spacer keeps the ions used in this ion implant step away from the critical regions of the source/drain diffusion.

Yeap, et al. discloses a procedure for forming an integrated circuit. In this integrated circuit, a gate structure is formed comprised of first and second layers, and that second layer is removed. Yeap, et al. discloses that a recess, which can cause a problem, can occur in the substrate during normal fabrication process, and that this problem can be overcome by keeping a spacer around the gate stack to mask that gate until the semiconductor substrate is doped. In the Office Action, the Examiner referred to an ion implantation step, during which the entire semiconductor device is exposed to the ions. The Examiner argued that, during this implantation step, the spacer around the gate stack masks the substrate from ions.

Moslehi discloses a semiconductor fabrication method and transistor structure. In this fabrication process, a spacer is provided around a gate stack. The Examiner, in the Office Action, referred to an ion implantation step, and argued that, during this ion implantation, this spacer acts to mask the substrate from ions.

There is an important, general difference between the present invention and the procedures disclosed in Yeap, et al. and Moslehi. With these latter procedures, the ion implantation steps referred to by the Examiner are performed for the purpose of implanting ions in the semiconductor substrate. In contrast, the implantation step of the present invention is done for the purpose of implanting ions in the gate layer.

This general difference between the procedures of Yeap, et al. and Moslehi and the method of the present invention is reflected in a number of more specific differences. For instance, with the present invention, the ions used in the implantation process are kept away from the semiconductor substrate. With the procedures of Yeap, et al. and Moslehi, exactly the opposite occurs – the ions are intentionally implanted in the semiconductor substrate.

Independent Claims 1 and 5 are being amended to describe more clearly this difference between the prior art and the invention. Specifically, both of these claims are being amended to describe the step of keeping the ins used in the ion implantation step, away from the semiconductor substrate, and that this step includes the step of using the spacer around the gate layer to help do this. Neither Yeap, et al. nor Moslehi discloses or suggests keeping the ions of the implantation step away from the semiconductor substrate.

This feature of the invention is useful because it allows a deep, doping implantation of the gate layer, while keeping doping implants away from critical source/drain regions.

The other references of record have been reviewed, and these other references, whether they are considered individually or in combination, also do not disclose or suggest the above-discussed feature of the invention.

Because of the above-discussed differences between Claims 1 and 5 and the prior art, and because of the advantages associated with those differences, claims 1 patentably distinguishes over the prior art and is allowable. Claims 2-4, 6, 7 and 18 are dependent from Claim 1 and are allowable therewith.

The changes requested herein to Claims 1 and 5 emphasize features already in the claims. In particular, both of these claims already describe the spacer around the gate layer, and an ion-implanting step. The amendments requested herein emphasize that these ions are kept away

from the semiconductor substrate. Accordingly, it is believed that entry of this Amendment is appropriate, and such entry is respectfully requested.

The Examiner is, thus, asked to enter this Amendment, to reconsider and to withdraw the rejection of Claims 1, 2, 4, 5, 6 and 18 under 35 U.S.C. 102, and the rejection of Claims 6 and 7 under 35 U.S.C. 103, and to allow Claims 1-7, and 18.

For the reasons set forth above, the Examiner is requested to reconsider and to withdraw the rejections of Claims 1, 2, 4, 5, 6, 7 and 18 under 35 U.S.C. 102 and 103. The Examiner is further asked to reconsider and to withdraw the rejections of Claims 1-4, 6, 7, 9 and 18 under 35 U.S.C. 112, and to allow Claims 1-7, 9 and 18. If the Examiner believes that a telephone conference with Applicants' Attorneys would be advantageous to the disposition of this case, the Examiner is requested to telephone the undersigned

Respectfully submitted,

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